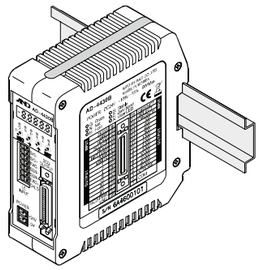
AD-4430B
DIN Rail Weighing Module

Simplified Instruction Manual



1WMPD4002677

1.1. This Manual

- This manual describes how the product works and how to get the most out of it in terms of performance. Read this manual thoroughly before using the product and keep it at hand for future reference.
- Refer to the instruction manual on the A&D home page.
  URL: http://www.aandd.co.jp/
- Product specifications are subject to change without any obligation on the part of the manufacturer to notify of changes.
- This manual is subject to change without notice at any time to improve the product. No part of this manual may be photocopied, reproduced, or translated into another language without the prior written consent of the A&D Company, limited.

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2. Cautions

2.1. Installation and Precautions

- The module complies class A computing device pursuant to Subpart J of Part 15 of FCC rules. (FCC = Federal Communications Commission in the U.S.A.)
- The module complies the statutory EMC (Electromagnetic Compatibility) directive 2004/108/EC and the Low Voltage Directive 2006/95/EC for safety of electrical equipment designed for certain voltages for European Directives.
- The module is a precision electronic instrument. Handle it carefully.
- Avoid vibration, shock, extremely high temperature and humidity, direct sunlight, dust, splashing water and air containing salt or sulfurous gases.
- Avoid places where inflammable gases or vapors are present.
- The operating temperature is -10°C to +50°C (14°F to 122°F).
- Ground the module and DIN rail.
- Keep cables away from power cables and other sources of electrical noise. Use a stable DC24 V power source that does not include step down voltage and noise.
- Do not share the earth ground line and power line with other electrical power equipment.
- When extending the load cell cable, separate it from the power cable and electrical cables with much noise.
- Do not turn on the module until installation is complete. The module is not equipped with a switch to turn off.
- Use a shielded load cell cable.
- Do not connect more sensors than the allowable number noted in the specifications.

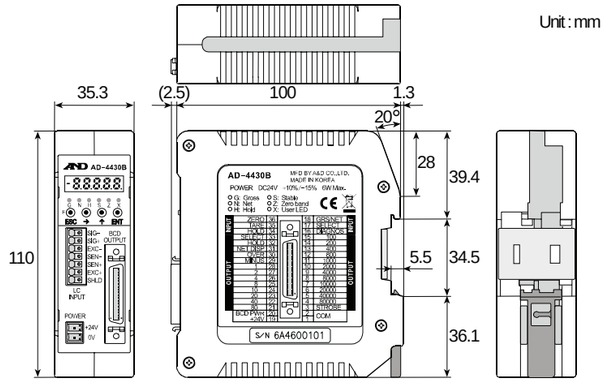
2.2. Cautions During Use

The AD-4430B is a precision instrument that measures microvolt output from sensors. Prevent noise sources such as power lines, radios, electric welders or motors from affecting the instrument.

- Do not disassemble the AD-4430B.
- In all hold modes, the hold data is saved digitally, so there is no drooping of the value displayed on the display panel or the analog output. Note that the hold function is disabled when the AD-4430B is disconnected from the power supply.

3. External Dimensions

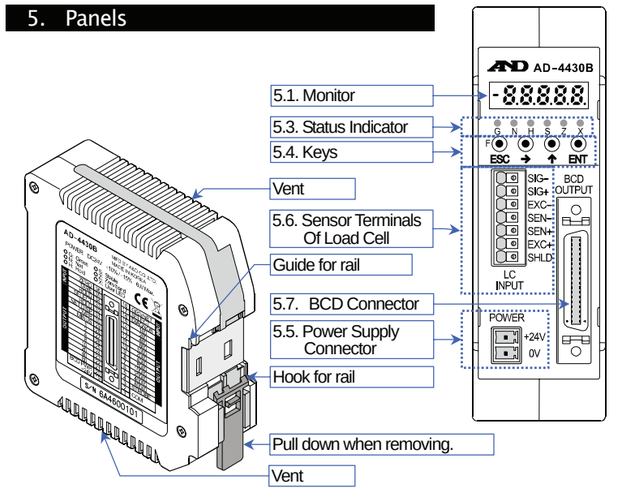
Unit : mm



4. General Specifications

Voltage requirement	DC 24 V +10%, -15%
Power requirement	Approximately 6 W
Sensor power supply	5V 350 Ω sensor. Up to four sensors can be connected.
Operating conditions	-10 °C to +50 °C, Max 85 %RH (no condensation)
External dimensions	35.3 × 110.0 × 101.3 mm (W×H×D)
Mass	Approximately 180 g

5. Panels

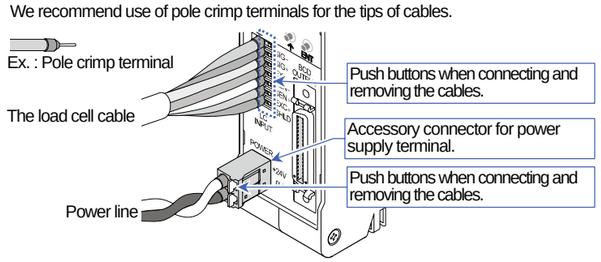


5.1. Monitor

The monitor displays measurement data and settings with 7 segments and negative sign. The decimal point is specified in function mode.

5.2. Connections

When connecting and removing the cables, push the buttons with a driver etc.
We recommend use of pole crimp terminals for the tips of cables.


Ex. : Pole crimp terminal
The load cell cable
Power line
Push buttons when connecting and removing the cables.
Accessory connector for power supply terminal.
Push buttons when connecting and removing the cables.

5.3. Status Indicator

LED	Meaning	
G	Gross :	LED lights when indicating gross value.
N	Net :	LED lights when indicating net value.
H	Hold :	LED lights when the hold function operates.
S	Stable :	LED lights when the current weighing value is stable.
Z	Zero :	LED lights when the weighing value is center zero.
X	This LED works by selected function at Fnc04.	

5.4. Keys

Operation	Function
F	The display switch between gross and net in factory setting.
→	"The zero key" to perform the zero adjustment in weighing mode. The key to change a selected item or move a flashed figure.
↑	"The tare key" that displays zero for net weighing. The key to select parameter or increase number in setting mode..
ENT	Press the key to turn on the display in standby (OFF mode). Press and hold the key to turn off the display in weighing mode. In the setting mode, this key to store new settings. "the enter key".
ESC	Function key can be selected the function and use in weighing mode. The return key or "the escape key" in setting mode.
ENT + F	Proceeds to function mode in weighing mode.
→ + ENT	Proceeds to check mode in the function mode.
F + ENT	Proceeds to calibration in standby (OFF mode).

5.5. Power Supply Connector

+24 V ..... D.C. Power Supply +24 V terminal.
0 V ..... D.C. Power Supply 0 V terminal.

⚠Cautions when wiring the power cables
Turn off all of the power supplies of devices related to the AD-4430B. Separate the power cable of the AD-4430B from other power cables and cables with electrical noise.

5.6. Sensor Terminals Of Load Cell

SIG- ..... The (-) input terminal of signal that is outputted from load cell.
SIG+ ..... The (+) input terminal of signal that is outputted from load cell.
EXC- ..... The (-) output terminal to load cell excitation voltage (-).
SEN- ..... The (-) input terminal for sensing input (-).
SEN+ ..... The (+) input terminal for sensing input (+).
EXC+ ..... The (+) output terminal for load cell excitation voltage (+).
SHLD ..... Connect shield of sensor cable.

5.7. BCD Connector

The circuit of BCD is isolated from the D.C. power supply and load cell circuit.
Supply D.C. +24 V between BCD PWR+24V terminal and COM terminal.

INPUT	ZERO	36	18	GRS/NET	INPUT
	TARE	35	17	SELECT	
	HOLD	34	16	DIAGNOS	
	SELECT	33	15	100	
	HOLD	32	14	200	
	NET DISP	31	13	400	
	OVER	30	12	800	
OUTPUT	MINUS	29	11	1000	OUTPUT
	1	28	10	2000	
	2	27	9	4000	
	4	26	8	8000	
	8	25	7	10000	
	10	24	6	20000	
	20	23	5	40000	
	40	22	4	80000	
	80	21	3	STROBE	
	BCD PWR +24V	20	2	COM	
		19	1		

5.8. Operation Mode

- Function mode (In weighing mode, ENT + F)
  The condition of the AD-4430B can be updated and be stored.
- Check mode (In function mode, → + ENT)
  The mode to check the AD-4430B.
- Calibration mode (When display is turned off, F + ENT)
  The mode to calibrate zero point and span of the AD-4430B using span mass.

6. Calibration

The AD-4430B measures the voltage of the sensor and displays it. Calibration mode calibrates (adjusts) so as to measure and display correctly.
Specify decimal point (CAL02), minimum division (CAL03) and weighing capacity (CAL04) in function mode.
Adjust the input voltage of zero point (CAL 07), the input voltage of span voltage (CAL 08) and mass corresponding to span voltage (CAL 09) in calibration mode.
The digital calibration can be performed in function mode.

Perform stable measurement in the calibration to prevent measurement error.
During a stable measurement, the S LED lights.
The decimal point flashes in calibration mode.

6.1. Span Calibration using Mass

Preset a unit, decimal point, minimum division and weighing capacity in function mode. The span calibration is performed using mass of the weighing capacity.
When C Er and a number are displayed, an error has occurred. Refer to "Calibration Errors" for details.
The flashing decimal point means "no weighing value".
Before the calibration, turn on the AD4430B more than 10 minutes so as to avoid temperature drift (change).

Step 1 When turning off the display, press and hold the F key and press the ENT key (F + ENT key). Then CAL of calibration mode is displayed.

Step 2 Press the ENT key to enter calibration mode. C-SEt is displayed. When returning to weighing mode, press the ESC key.

6.1.1. Zero Calibration

Step 3 Press the ENT key to display CAL 0 . When skipping zero calibration, press the ↑ key and proceed to step 5.

Step 4 Place nothing on the weighing pan. Confirm that the S LED is lit and press the ENT key. Then ----- is displayed for 2 seconds. When canceling span calibration and returning to weighing mode, press the ESC key twice.

6.1.2. Span Calibration

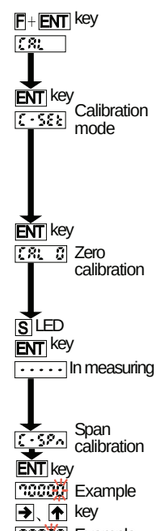
Step 5 When C-SPn is displayed, press the ENT key. The current span mass is displayed. A figure for the mass flashes. Specify a new value for the mass using the → and ↑ keys. When canceling span calibration and returning to weighing mode, press the ESC key twice.

Step 6 Place the mass on the weighing pan. Confirm that the S LED is lit and press the ENT key. Then ----- is displayed for 2 seconds.

Step 7 When C-End is displayed, remove the mass from the weighing pan. When repeating span calibration, press the ↑ key.

Step 8 Press the ESC key. Then C-SEt is displayed and calibration data is stored in the FRAM of the AD-4430B.

Step 9 Press the ESC key to return to weighing mode.



6.2. Calibration Errors

Display	Cause	Treatment
C Er1	Resolution (Weighing capacity / minimum division) exceeds the limitation.	Make the minimum division greater or make the weighing capacity smaller. The specified value depends on specifications of the weighing system.
C Er2	The voltage in zero calibration is too large.	Check the load cell rating and connection. When nothing is wrong with the rating and connection, adjust the load cell output. When the load cell or A/D converter may be the cause of error, confirm this by using the check mode.
C Er3	The voltage in zero calibration is too small.	
C Er4	Mass value exceeds the weighing capacity.	Use an appropriate calibration weight and calibrate again.
C Er5	Mass value is too light for calibration.	
C Er6	Sensitivity of the load cell is too small.	Use a load cell with higher sensitivity or make the minimum division greater.
C Er7	The polarity of the load cell output is reversed.	Check the load cell connection.
C Er8	The output of the weighing capacity is out of range.	Use a load cell with a greater rating or make the weighing capacity smaller.

6.3. Digital Linearization (LNR)

Digital linearization is the non-linearity compensation function that can rectify or reduce linearity deviation between zero point and weighing capacity.

- Up to four points can be specified except zero. (Refer to LNR01)
  Relationship of points : Zero = LNR 0 < LNR 1 < LNR 2 < LNR 3 < LNR 4
- The high-order correction curve is used so that zero point and individual points are arranged in a straight line.
- Digital linearization includes span calibration.
  When C Er and a number are displayed, an error has occurred. Refer to "Calibration Error" for details.
  A flashing decimal point means "no weighing value".
  Before calibration, turn on the AD4430B more than 10 minutes so as to avoid temperature drift (change).

Step 1 When turning off the display, press and hold the F key and press the ENT key (F + ENT key). Then CAL of calibration mode is displayed. Press the ENT key to display L-SEt.

Step 2 Press the ↑ key to select L-SEt and press the ENT key to enter digital linearization.

Step 3 LNR 0 of the zero point is displayed.

Step 4 Place nothing on the pan.
While S LED is displayed, press the ENT key to store the weighing value.
Then ------ is displayed for 2 seconds.

Step 5 When displaying LNR 1, press the ENT key to select a mass value. Specify it using the → and ↑ key.

Step 6 Place the mass on the pan.
While S LED is displayed, press the ENT key to store the weighing value.
Then ------ is displayed for 2 seconds.

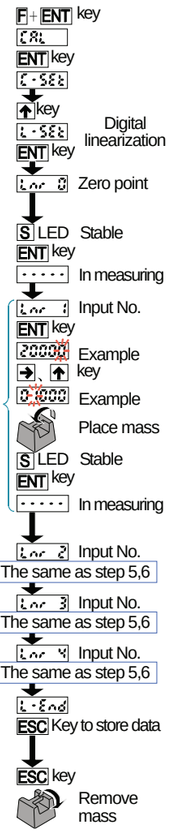
Step 7 LNR 2 is displayed. Repeat the same operation as Step 5 and Step 6 at the second point.

Step 8 LNR 3 is displayed. Repeat the same operation as Step 5 and Step 6 at the third point.

Step 9 LNR 4 is displayed. Repeat the same operation as Step 5 and Step 6 at the fourth point.

Step 10 L-End is displayed. Press the ESC key to store new parameters into FRAM and display L-SEt.

Step 11 Press the ESC key to return to weighing mode.
Remove all of mass from the pan.



7. Function Mode (Function List)

The function mode stores parameters to control the weighing module.
The parameters are stored even without power supplied.

7.1. Outline

Types of Functions
- CAL .....Calibration
- LNR .....Linearity
- FNC .....Basics
- HLD .....Hold function
- BCD .....BCD output

The input voltage of the zero point (CAL 17), the span input voltage (CAL 18), mass for span input voltage (CAL 19) are revised in calibration mode.
The decimal point flashes in function mode.
If pressing the → key while displaying the digital filter (FNC05), the current weighing value can be monitored. Press the → key again to return function mode.

7.2. Operation

7.2.1. Select Modes Under Function Mode

↑ .....Selects a type of select mode (3 upper figures)
ENT .....Enters a selected mode.
↑ .....Selects an item under the selected mode (2 lower figures)
ENT .....Enters the item.
ESC .....Stores parameters and returns to weighing mode.

7.2.2. Parameters Selection And Digital Parameters

P Type of parameter selection (all figures flashing)
↑ .....Selects a parameter.
ENT .....Activates (store) parameter and returns to select mode.
ESC .....Deactivates parameter and returns to select mode.

D The type to change value (figure flashing)
→ .....Moves the flashing figure.
↑ .....Changes the value of the flashing figure.
ENT .....Activates (store) value and returns to select mode.
ESC .....Deactivates value and returns to select mode.

7.3. Types and Items

7.3.1. Calibration (CAL) Of Select Mode

Item Range	Item Name	Descriptions	Default Type
CAL02 0 to 0.0000	Decimal point position	Decimal point position of value. 0 0.0 0.00 0.000 0.0000	0 P
CAL03 1 to 50	Minimum division (A scale / digit)	Minimum division of value. 1 2 5 10 20 50	1 P
CAL04 1 to 99999	Weighing capacity (Max. measurement)	Measurement can be displayed up to +8 digits (8 scales) from capacity. Decimal point depends on CAL02.	70000 D
CAL05 0 to 100	Zero adjustment range	The range that the → key (zero key) works. Deviation from the calibrated zero point [%].	2 D
CAL06 0.0 to 5.0	Zero tracking time	Used with CAL07 for zero tracking [sec.]	0.0 D
CAL07 0.0 to 9.9	Zero tracking band	Used with CAL06 for zero tracking [digit]	0.0 D
CAL08 0.0 to 9.9	Stability detection time	Used with CAL09 for stability detection [sec.]	1.0 D
CAL09 0 to 9	Stability detection band	Used with CAL08 for stability detection [digit]	2 P
CAL 10 0 to 1	Tare and zero adjustment when unstable	The adjustment when value is unstable. 0: Disables both functions. 1: Enables both functions.	1 P
CAL 11 0 to 1	Tare when the gross weight is negative	Tare when the gross weight is negative. 0: Disables tare. 1: Enables tare.	1 P
CAL 12 0 to 1	Output when overflow and unstable	Serial output when overflow and unstable. 0: Disables output. 1: Enables output.	1 P
CAL 13 1 to 3	Exceeding negative gross weight	Judgment when the negative gross is exceeded. 1: Gross < -99999 2: Gross < -capacity 3: Gross < -19 digit	1 P
CAL 14 1 to 2	Exceeding negative net weight	Judgment when the negative net is exceeded. 1: Gross < -99999 2: Gross < -Capacity	1 P
CAL 15 0 to 1	Clear the zero value	Select to clear the zero value. 0: Disable 1: Enable	1 P
CAL 16 0 to 1	Zero setting when power is turned on	When turning power on, 0: Disable 1: Enable	0 P
CAL 17 -7.0000 to 7.0000	Input voltage at zero	Input voltage of the zero point [mV/V]	0.0000 D
CAL 18 0.0001 to 9.9999	Input voltage at span	Input voltage of the full scale [mV/V]	3.2000 D
CAL 19 1 to 99999	Calibration weight corresponding to input voltage at span	Mass value to equivalent to span input voltage. (CAL 18) Decimal point depends on CAL02.	32000 D
CAL20 9.7500 to 9.8500	Gravity acceleration of place of calibration	Gravity acceleration of the place where calibrating the module. [m/s^2]	9.8000 D
CAL21 9.7500 to 9.8500	Gravity acceleration of place of use	Gravity acceleration of the place where using the module. [m/s^2]	9.8000 D
CAL28 0 to 1	Disable averaging hold	When turning on, the zero operation. 0: Enable 1: Disable	0 P

7.3.2. Linearity (LNR) Of The Select Mode

Item Range	Item Name	Descriptions	Default Type
LNR01 1 to 4	Number of input points	Number of adjustment point. If 0, 1 or 2 is selected, digital linearization is not used.	0 P
LNR02 7.0000 to 7.0000	Linear-zero	Input voltage for linear-zero input. [mV/V]	0.0000 D
LNR03 0 to 99999	Linear 1 Mass value	The mass value for linear 1 input. Decimal point depends on CAL02.	0 D
LNR04 0.0000 to 9.9999	Linear 1 Span voltage	The span voltage between linear-zero and linear 1 input. [mV/V]	0.0000 D
LNR05 0 to 99999	Linear 2 Mass value	The mass value for linear 2 input. Decimal point depends on CAL02.	0 D
LNR06 0.0000 to 9.9999	Linear 2 Span voltage	The span voltage between linear-zero and linear 2 input. [mV/V]	0.0000 D
LNR07 0 to 99999	Linear 3 Mass value	The mass value for linear 3 input. Decimal point depends on CAL02.	0 D
LNR08 0.0000 to 9.9999	Linear 3 Span voltage	The span voltage between linear-zero and linear 3 input. [mV/V]	0.0000 D
LNR09 0 to 99999	Linear 4 Mass value	The mass value for linear 4 input (Full scale). Decimal point depends on CAL02.	0 D
LNR10 0.0000 to 9.9999	Linear 4 Span voltage	The span voltage between linear-zero and linear 4 input (Full scale). [mV/V]	0.0000 D

7.3.3. Basics (FNC) Of The Select Mode

Item Range	Item Name	Descriptions	Default Type
FNC01 0000 to 1111	Disable key switches	Figure corresponds to each key (switch). These are enabled at weighing mode. Figure 4 fig. ESC 3 fig. → 2 fig. ↑ 1 fig. ENT Parameter 0: Enable 1: Disable	0000 2 進数 D
FNC02 0 to 7	F key	0: None 4: Momentary switch 1: Print command 5: Display exchange 2: Hold 6: Tare clear 3: Alternative switch 7: Zero clear (depends on CAL 15)	5 P
FNC03 1 to 3	Display update rate	1: 20 times/s 2: 10 times/s 3: 5 times/s	20 P
FNC04 0 to 9	X display	0: None 1: Zero tracking in progress 2: Alarm (Zero range setting error, over) 3: F key status 4: Zero band 5: HI output (Over the upper limit value) 6: OK output (Between upper and lower limit values) 7: LO output (Below the lower limit value) 8: User input 1 9: User output 1	0 P
FNC05 0 to 16	Low pass digital filter	Selects a cutoff frequency. 0: None 6: 20.0 Hz 12: 2.8 Hz 1: 100.0 Hz 7: 14.0 Hz 13: 2.0 Hz 2: 70.0 Hz 8: 10.0 Hz 14: 1.4 Hz 3: 56.0 Hz 9: 7.0 Hz 15: 1.0 Hz 4: 40.0 Hz 10: 5.6 Hz 16: 0.7 Hz 5: 28.0 Hz 11: 4.0 Hz	15 P
FNC07 1 to 3	Hold	1: Hold immediately 2: Peak hold 3: Averaging hold	1 P
FNC08 -99999 to 99999	Set value of near-zero	The reference value for near-zero. Decimal point depends on CAL02.	10 D
FNC09 1 to 2	Mass to be compared with near-zero	1: Gross weight 2: Net weight	1 P
FNC 10 -99999 to 99999	Set value of upper limit	Reference value for the upper limit. Decimal point depends on CAL02.	10 D
FNC 11 -99999 to 99999	Set value of lower limit	Reference value for the lower limit. Decimal point depends on CAL02.	-10 D
FNC 12 1 to 2	Mass to be compared with upper & lower limit	1: Gross weight 2: Net weight	1 P
FNC 13 1 to 2	Output logic of upper and lower limit	The logic of the comparator function output. 1: Positive logic 2: Negative logic	1 P

7.3.4. Hold Function (HLD) Of The Select Mode

Item Range	Item Name	Descriptions	Default Type
HLD01 0.00 to9.99	Average time	Time to calculate the average. [sec.] 0.00 : Not used	0.00 D
HLD02 0.00 to9.99	Start wait time	Time to wait before commencing hold or averaging. [sec.]	0.00 D
HLD03 0 to 2	Condition of automatic start	Condition for starting the hold or averaging. 0: Not used 2: Above the near-zero range 1: Above the near-zero range, and stable	0 P
HLD04 0 to1	Release due to falling control input	Release when control input is falling. 0: Do not release 1: Release	1 P
HLD05 0.00 to9.99	Time release	Release after a set amount of time has passed. [sec.] 0.00 : Continue	0.00 D
HLD06 0 to 99999	Release due to range of fluctuation	Release when fluctuation from the holding value exceeds a set value. Decimal point depends on CAL02. 0 : Continue	0 D
HLD07 0 to 1	Release in near-zero range	Release when the weighing value is in the near-zero range. 0: Do not release. 1: Release.	0 P

7.3.5. BCD Output (BCD) Of The Select Mode

Item Range	Item Name	Descriptions	Default Type
BCD01 1 to4	Output data	1: Weighing value 3: Net weight 2: Gross weight 4: Data specified at BCD input	1 P
BCD02 1 to3	Data transfer mode	1: Stream 3: Manual printing 2: Automatic printing	1 P
BCD03 5 to1000	Data transfer rate	5 times/sec. 10 times/sec. 20 times/sec. 100 times/sec. 1000 times/sec. } (Depends on FNC03)	20 P
BCD04 1 to2	Output logic of data transfer	1: Positive logic 2: Negative logic	2 P
BCD05 1 to2	Output logic of negative sign	1: Positive logic 2: Negative logic	2 P
BCD06 1 to2	Output logic of status	1: Positive logic 2: Negative logic	2 P
BCD07 1 to2	Output logic of strobe	1: Positive logic 2: Negative logic	2 P
BCD08 0 to5	Input selection	0: None 1: Clear zero 2: Clear tare 3: Changing between gross and net 4: Print command 5: F key	3 P
BCD09 0 to12	Output selection	0: None 1: Stabilization 2: During tare 3: Zero band 4: Hold busy state 5: HI output (Over upper limit) 6: OK output (Within upper and lower limits) 7: LO output (Under lower limit) 8: During operating weighing (On) 9: During operating weighing (1 Hz) 10: During operating weighing (50 Hz) 11: Alarm (Zero correction error and tare error) 12: Busy F key	1 P

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